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Tamarack

An American Wood

Tamarack grows from Maine to Minnesota, throughout much of Canada, and in Alaska. Most of its volume in the United States is in the northern Lake States and Maine. The tree, whose needles fall in autumn, is found especially on wet lowlands where it grows fast in full sunlight. The brownish heartwood contrasts with the narrow, whitish sapwood. The wood—one of the heaviest of the northern conifers—is medium to fine textured, odorless, tasteless, and somewhat oily. It rates intermediate in strength, is easily pulped, and has fairly high heating value. Recent use has been largely for pulp products, but in earlier days tamarack was used in the construction of wooden ships and for lumber.

Tamarack

(Larix laricina (Du Roi) K. Koch)

William F. Johnston[1] and Eugene M. Carpenter[2]

Distribution

Tamarack has one of the widest ranges of all North American conifers (fig. 1). The tree grows throughout much of Canada, with a range extending to the northern limit of tree growth. In the United States tamarack's main range extends from Maine to Minnesota; the tree also grows locally as far south as northern West Virginia. A major disjunct area occurs in the Yukon and Kuskokwim drainages in interior Alaska.

In the United States tamarack is most abundant in the northern Lake States, particularly Minnesota, where it grows mainly on glacial lakebeds and lake-swamp-moraine plains at elevations averaging about 1,000 feet. The tree is also abundant in Maine from elevations of less than 500 feet to more than 1,000 feet. The climate in which tamarack grows in the Lake States and Maine is generally humid, with short, cool summers and long, somewhat severe winters. The average frost-free period ranges from about 90 to 150 days.

Tamarack is found mainly on poorly drained sites, especially on wet lowlands where the organic soil is more than 12 inches thick. However, it grows best on moist but well-drained loamy soils along streams, lakes, and swamps. Tamarack is characteristic of poor swamps where the soil water is weakly enriched with mineral nutrients. However, the tree grows on the full range of organic-soil sites from rich swamp to raised bog and is also found on mineral soils ranging from heavy clay to coarse sand.

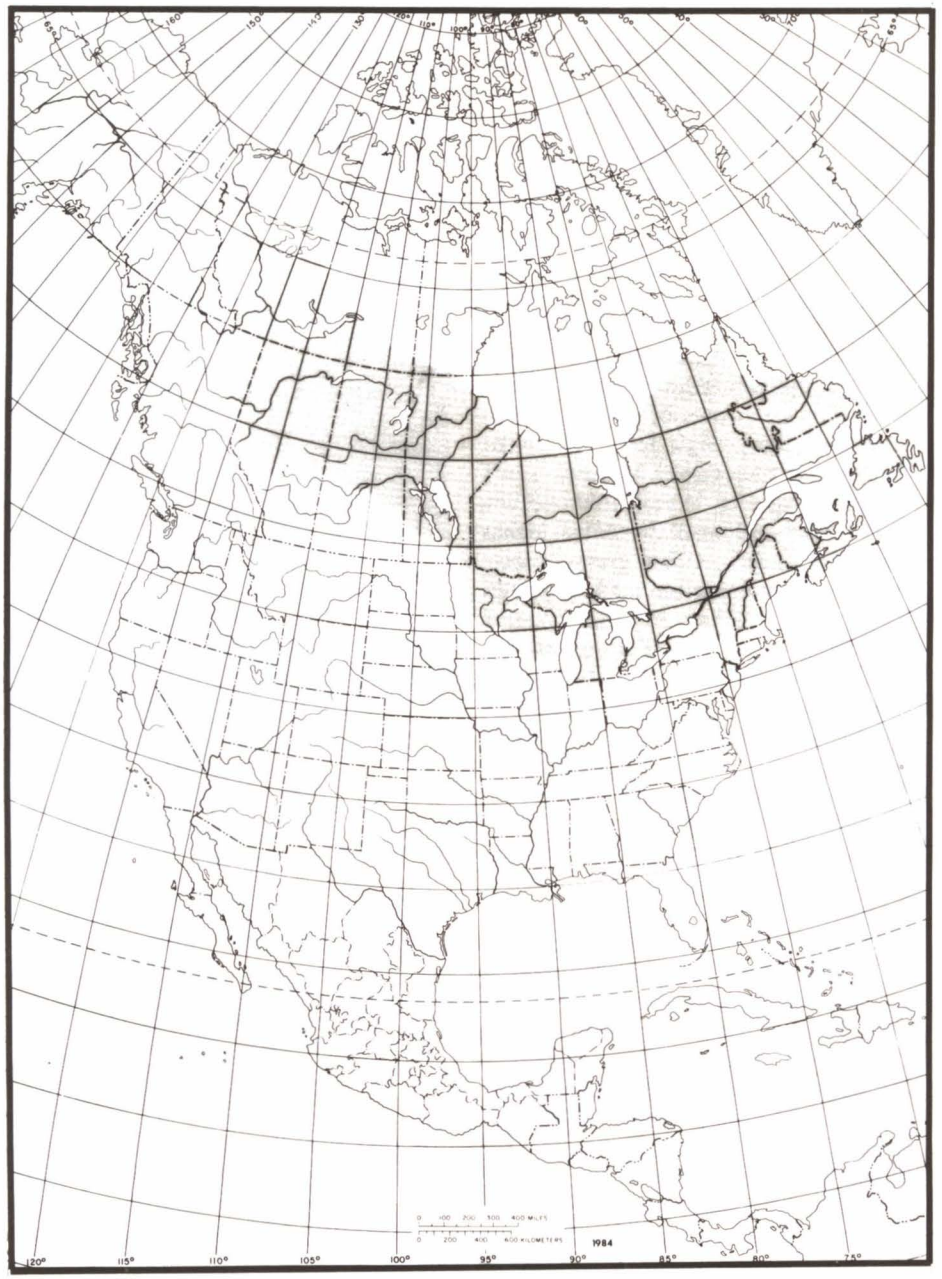

Figure 1—Natural range of tamarack.

In northern Minnesota and the boreal region of Canada tamarack forms extensive pure stands. In the rest of its range the tree occurs in isolated pure stands or as a minor component in several other forest types. Black spruce *(Picea mariana)* is usually the main tree associate in mixed stands on all sites. Other common associates, especially on the better organic-soil (swamp) sites, include northern white-cedar *(Thuja occidentalis)*, balsam fir *(Abies balsamea)*, black ash *(Fraxinus nigra)*, and red maple *(Acer rubrum)*. Paper birch *(Betula papyrifera)* and eastern white pine *(Pinus strobus)* are common associates on transitional sites between wet lowlands and dry uplands.

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Description and Growth

Tamarack is a small- to medium-sized tree, usually 50 to 75 feet tall and 14 to 20 inches in diameter at breast height (4.5 feet) at maturity. A few trees may grow as large as 115 feet tall and 40 inches in diameter. In closed stands it is characteristically a straight, slender tree with a narrow, pyramidal crown; the bole is often clear for one-half to two-thirds of its length (see cover photo). Tamarack typically has a shallow, spreading root system. On fairly dry sites roots of larger trees grow at a sharp angle from the trunks, forming knees.

Tamarack needles are ¾ to 1¼ inches long and are bright blue green in the summer, turning yellow and dropping in the autumn. They grow singly on new, long shoots and in dense clusters on older, short shoots (fig. 2). The cones are one-half to three-quarters of an inch long; the scales are slightly longer than they are broad, with their margin sparingly and irregularly toothed (fig. 3). Seeds are one-eighth of an inch long and have light chestnut-brown wings one-quarter of an inch long. The bark is thin and smooth on young trees, later becoming one-quarter to one-half of an inch thick or more and roughened by small, thin, reddish-brown scales (fig. 4).

Figure 2—Clusters of tamarack needles.

Good seed crops are produced every 3 to 6 years. Germination and early growth are best on warm, moist mineral or organic soil with a light cover of herbaceous vegetation. Slash-burned seedbeds and hummocks of slow-growing sphagnum moss generally favor seedling establishment. Vegetative reproduction of tamarack is uncommon except along the northern tree limit. Although seedlings can tolerate some shade during the first several years, they must become dominant to survive. Thus tamarack should be grown in even-aged stands or it will eventually be succeeded by its more tolerant associates black spruce, northern white-cedar, and balsam fir. Tamarack forests may be reproduced by clearcutting mature stands in strips or by leaving well-spaced seed trees on harvest areas. However, satisfactory reestablishment will often require site preparation to improve seedbeds and control competing vegetation.

If exposed to full sunlight, tamarack is one of the fastest growing conifers on uplands and lowlands. Annual height growth on good sites may average 1½ to 2 feet for the first 20 to 30 years. However, growth rate differs greatly by site conditions, with the potential being much greater on uplands than on lowlands; growth apparently drops sharply when the crowns close or after the age of 40 to 50 years. Thinning is probably economically feasible only on good sites when the objective is to grow high-quality products such as poles and sawtimber. Tamarack reaches a maximum age of 180 years or more, but timber stands should be harvested at roughly age 100 on lowlands and age 70 on uplands.

Tamarack has few major pests. The most serious are two insects, the larch sawfly and larch casebearer. Sawfly

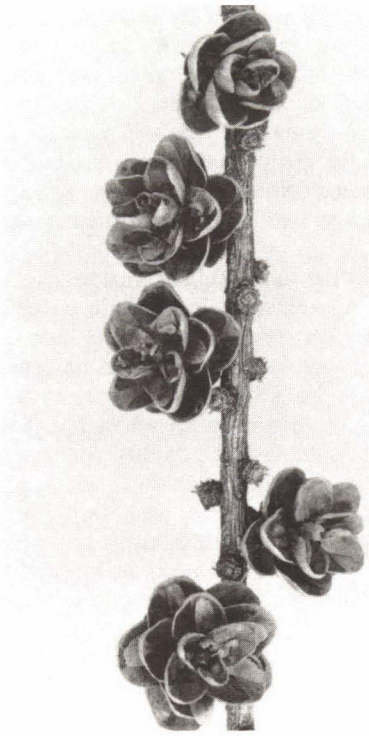

Figure 3—Cones and short shoots of tamarack.

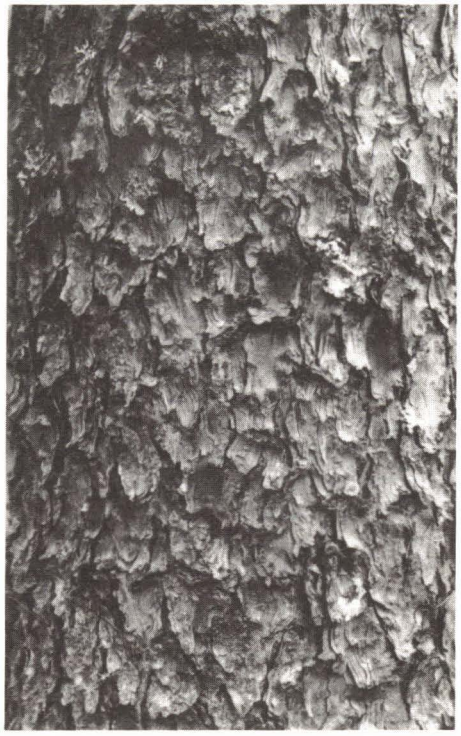

Figure 4—Bark of a mature tamarack.

outbreaks have been widespread and recurring, causing tremendous losses. Casebearer outbreaks have killed many trees in some areas. Other pests include the porcupine, which commonly deforms or kills tamarack trees by feeding on the inner bark, and the snowshoe hare, whose browsing sometimes kills many seedlings. Several rots and other diseases are reported on tamarack, but none has an economic impact on its culture.

Agents besides pests may also severely damage tamarack. Impeded drainage caused by road crossings and beaver damming often kills stands or reduces their growth. Tamarack is fairly windfirm, but strong winds can uproot large trees growing on wet lowlands where rooting is shallow. And although lowlands are normally too wet to burn, almost any ground fire that does occur kills the tree because it has thin bark and shallow roots.

Common Names

The name most commonly used is tamarack, a word of Algonquian origin. It is also commonly called eastern larch and sometimes American larch, Alaska larch, and hackmatack.

Related Commercial Species

Tamarack, a native larch, is listed separately in Lake States' timber inventories. But it is often reported with other softwoods and is combined with eastern hemlock *(Tsuga canadensis)* in pulpwood production statistics for the Northeast. Introduced larches (mostly hybrids) have been planted widely, especially in New York where their acreage is reported separately. The volumes reported in this leaflet, however, are estimates for tamarack only.

Supply

Tamarack stands presently occupy about 900,000 acres of commercial forest land[3] in the United States. Half of this acreage occurs in Minnesota and most of the remainder is found in Wisconsin, Michigan, and Maine. Small areas of tamarack occur in New York and several other Northeastern and North Central States. In interior Alaska small amounts of tamarack occur on commercial forest land in white spruce *(Picea glauca)* or black spruce stands.

The volume of tamarack is about 580 million cubic feet of growing stock, which includes 970 million board feet of sawtimber.[4] Of the reported volumes, about 80 percent of the growing stock and 70 percent of the sawtimber are in the Lake States; the rest is in Maine. Minnesota alone has 43 percent of the growing stock and 36 percent of the sawtimber.

Production

Tamarack has never been a major commercial timber species, but tamarack was an important specialty material used in constructing wooden ships through the early 1900's. Tamarack is now used principally for pulpwood; annual production in the Lake States has averaged 44,000 cords for the last 10 years and estimates indicate about 20,000 cords were produced in the Northeast in 1981. Minnesota accounted for 82 percent of the 52,000 cords harvested in the Lake States in 1980. Tamarack pulpwood production in the United States reached a maximum of 95,000 cords in 1926.

Production of tamarack lumber is low.

[3] Land capable of producing industrial wood and not withdrawn from harvesting by law or regulation.

[4] Growing stock is the volume of live trees 5.0 inches in diameter and larger. Sawtimber is the volume of trees 9.0 inches in diameter and larger, International ¼-inch Log Rule.

The annual harvest of saw logs (mainly for lumber) in the Lake States in 1980–81 was approximately half a million board feet, which is equivalent to only about 1,000 cords. However, more than 100 million board feet of lumber were produced annually from 1906 to 1914, when major lumbering activity took place in Lake States' virgin forests. Production then decreased markedly and reached a level of 2 to 4 million board feet per year from 1930 to 1947, the last year tamarack lumber production was documented.

Outbreaks of the larch sawfly in the Northeast in the latter part of the 19th century and in the Lake States in the first quarter of the 20th century killed much mature tamarack timber. Salvage of dead and dying tamarack may have influenced production statistics in the Lake States, where peak production of tamarack lumber coincided with years of heavy defoliation by the sawfly. It is also possible that the loss of much standing timber contributed to the marked decrease in production after the peak years.

Posts, poles, mine timbers, and railroad ties were produced in small quantities prior to 1945. Substantial quantities of tamarack were used for fuel in earlier days, and its use for fuel has been documented again recently after a lapse of many years. More than 1,900 cords of tamarack fuelwood were harvested in Minnesota in 1975 and almost 700 cords in Wisconsin in 1981.

Characteristics and Properties

Tamarack heartwood is yellowish to russet brown, without the reddish tinge characteristic of western larch *(Larix occidentalis)*. Sapwood is whitish and generally less than an inch wide. Growth rings are moderately wide to wide (8 to 20 per inch), with an abrupt transition between the light-colored earlywood and the dark, conspicuous latewood. The earlywood zone usually makes up three-fourths or more of each annual ring. The wood is medium to fine textured, slivery, odorless, tasteless, and somewhat oily. Tamarack is one of the heaviest of the northern conifers; based on ovendry weight and green volume, its specific gravity averages 0.49, and its density at 12 percent moisture content is about 35 pounds per cubic foot.

Tamarack wood rates intermediate in strength, stiffness, and hardness and is moderately high in shock resistance. During drying, tamarack has moderately large shrinkage, but moderately low warping and checking. It is difficult to penetrate with preservatives but has good natural resistance to decay. It ranks low in paint retention. Tamarack is somewhat uneven grained; its distinct earlywood to latewood contrast produces strong figures on flat-grained surfaces and distinct figures in quartersawn material. Spiral grain is common. The wood is easily pulped by the sulfate process and is readily reduced by the mechanical or groundwood process. However, tamarack requires significantly more power to grind than white spruce. It ranks high in heating value among softwoods, similar to the hardwoods red maple and paper birch.

Principal Uses

In the United States tamarack is used mainly to manufacture pulp products, especially the transparent glassine paper used for window envelopes. Because of its natural decay resistance and good strength properties, tamarack is also used for posts, poles, mine timbers, and railroad ties. Other uses include rough lumber, fuelwood, boxes, crates, and pails. In interior Alaska young tamarack stems are used for dogsled runners, boat ribs, and fishtraps; in northern Alberta the branches are used to make duck and goose decoys.

Tamarack wood is still used to some extent for boatbuilding. In the past, however, it was widely used in wooden ships, principally to join ribs to deck timbers, but also for timbers and planking. Indians used the fine, stringy roots to bind seams of birch bark canoes, the wood for arrow shafts, and the bark for medicine; colonists used the soft needles to stuff pillows and mattresses.

In addition to its use for various products, tamarack has certain wildlife values. Porcupines feed on the inner bark, snowshoe hares browse on seedlings, and red squirrels eat the seeds. Birds common in tamarack stands during the summer include the white-throated and song sparrows, veery, common yellowthroat, and Nashville warbler. The American osprey, a sensitive species, often nests in lowland types such as tamarack. And the great gray owl utilizes large tamarack stands in northern Minnesota, the southern limit of its breeding range in central North America.

Tamarack is esthetically appealing, particularly in early autumn when its needles turn yellow. It has significant potential as an ornamental because of its rapid growth and fall color, although it is only infrequently used. Tamarack is especially valuable in suburban areas; however, because the tree needs ample moisture and is sensitive to polluted air and heat, it is not suitable for shade trees on city streets.

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